Weldon Spring Site
Fundamentals of Radiation

FACT SHEET

This fact sheet provides information developed by the former WSSRAP Community Relations Department to provide comprehensive descriptions of key activities that took place throughout the cleanup process at Weldon Spring, Missouri. This site is managed by the U.S. Department of Energy Office of Legacy Management.

Radiation—It's a Fact of Life

It has been with us since the beginning of time. Everyone who has ever walked on this planet has been exposed to radiation. For the most part, nature is the largest source of exposure. It's in the air we breathe, the ground we walk on, and even the food we eat.

The radiation we receive from all natural and some man-made sources is called "background radiation." The millirem (mrem) is a unit used for measuring radiation received by a person. The total average background for radiation received by people living in the United States is 360 millirems per year (mrem/yr), of which 300 mrem/yr is from natural sources, and 60 mrem/year is man-made.

Some Sources of Natural Background Radiation

- Cosmic — Radiation from the sun and stars
- Internal — Radiation from naturally radioactive elements that we eat, drink, and breathe
- Terrestrial — Radiation from naturally radioactive elements in rocks and soil

Also, radiation from radon gas, which is a decay product of naturally radioactive components of the Earth's crust.

Natural background radiation can vary greatly. Radiation levels from cosmic rays are greater for people on airplanes and those living on the Colorado Plateau. Because of its higher altitude, Denver, Colorado, has nearly three times the national average of naturally occurring background radiation. However, no greater rate of cancer, or other radiation-linked illnesses, has been detected in Denver residents.

Man-Made and Other Sources of Radiation

- Medical — Radiation from X-rays and radioactive elements for medical use
- Building materials — Radiation from naturally occurring radioactive elements in the materials we use to build our homes
- Consumer goods — Radiation from such items as smoke detectors and old lantern mantles

Background radiation does not include that received from smoking. A person who smokes one pack of cigarettes a day receives an additional radiation of 1,300 mrem/yr, four times the U.S. average natural background radiation level. This extra radiation is due to the naturally radioactive polonium that sticks to tobacco leaves. Polonium is a decay product of naturally occurring uranium and has always been a part of our environment.

Occupationally Exposed Limits

The legal limit imposed by the federal government in this country for an occupationally exposed worker is 5,000 mrem/yr. The highest average worker radiation dose during the Weldon Spring Site Remedial Action Project (WSSRAP) occurred in 1998 during chemical stabilization and solidification (CSS) plant operations. The average internal and external exposure for that period was about 9 mrem/yr. This exposure is comparable to a single chest X-ray or two round trips cross-country on commercial airliners. WSSRAP has had only a few worker radiation doses reported above 100 mrem/yr, the highest of which was an external radiation dose of 170 mrem/yr in 1994 during building demolition.

Hereditary Effects

Some 77,000 children were born to survivors of the atomic bomb explosions in Hiroshima and Nagasaki, Japan. No increased rate of birth defects has been noted in those children or their children or their grandchildren. The fourth generation is currently being monitored for problems. So far none have been detected.

There is a greater rate of birth defects in children who are exposed to high amounts of radiation while in the womb. These effects are seen after the mother and her unborn child have been exposed to more than 15 rem of radiation. That is, 15,000 mrem.

The reportable dose for WSSRAP in 2000 was 0 mrem/yr.

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